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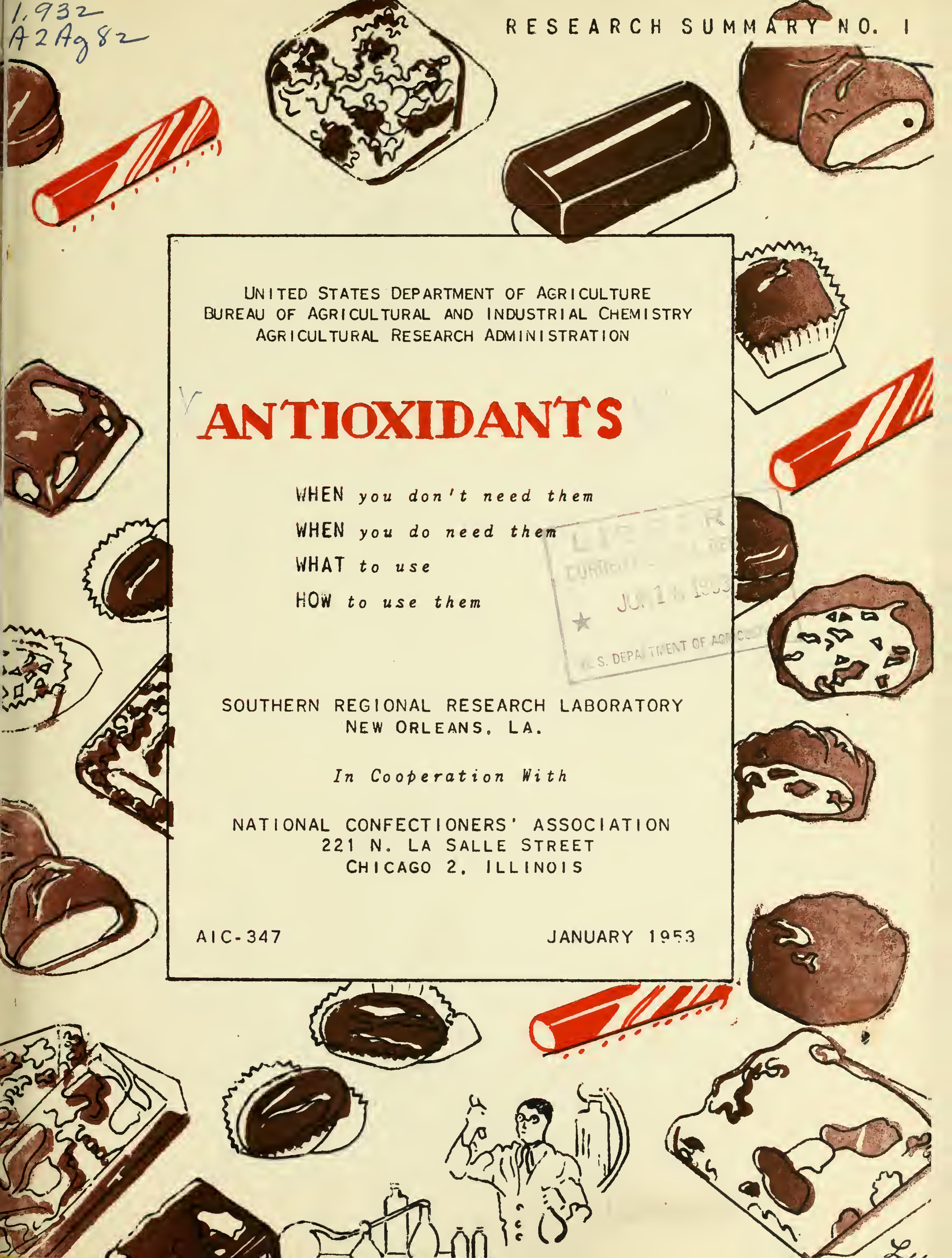


UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY
AGRICULTURAL RESEARCH ADMINISTRATION

ANTIOXIDANTS

WHEN *you don't need them*

WHEN *you do need them*

WHAT *to use*

HOW *to use them*

JUN 1 1953
U.S. DEPARTMENT OF AGRICULTURE

SOUTHERN REGIONAL RESEARCH LABORATORY
NEW ORLEANS, LA.

In Cooperation With

NATIONAL CONFECTIONERS' ASSOCIATION
221 N. LA SALLE STREET
CHICAGO 2, ILLINOIS

AIC-347

JANUARY 1953

FOREWORD

This is the first of a series of Research Summaries intended to present in concise and convenient form the conclusions reached in the experiments being conducted under the joint sponsorship of the Department of Agriculture and the National Confectioners' Association. They will be issued from time to time as the work on a particular problem is completed. Full details of the experiments upon which these conclusions are based will be found in the appropriate reports on "Progress in Candy Research," to which reference is made in this summary.

This particular study has established on an experimental basis the value of antioxidants, when properly used, in stabilizing certain types of candy requiring such protection. Before any company decides to produce confections incorporating these ingredients, it is suggested that experiments be conducted in its own factory under normal operating conditions. Candy manufacturers should be guided by the correspondence between Mr. Philip P. Gott, President of the National Confectioners' Association, and Mr. C. W. Crawford, Commissioner of Food and Drugs, Department of Health, Education, and Welfare, facsimile copies of which are appended to this summary.

NATIONAL CONFECTIONERS' ASSOCIATION

John Henry, Chairman, Research Committee

THE RIGHT ANTIOXIDANT, USED PROPERLY, WILL PROLONG THE SHELF-LIFE OF YOUR CANDY

A good antioxidant added to the fat in your candy will prevent losses from rancidity.

WHEN YOU DON'T NEED THEM:

VEGETABLE SHORTENINGS. No antioxidant is needed when high grade vegetable shortenings are used.

WHEN YOU DO NEED THEM:

ANIMAL FAT SHORTENINGS. Antioxidants will prolong shelf-life. Inspect the label: manufacturer usually adds the antioxidant, but if he doesn't you should.

BUTTER: Antioxidants will prolong the shelf-life of butter candy.

WHAT TO USE:

The effectiveness of 7 commercial antioxidants is explained on the following pages.

HOW TO USE THEM:

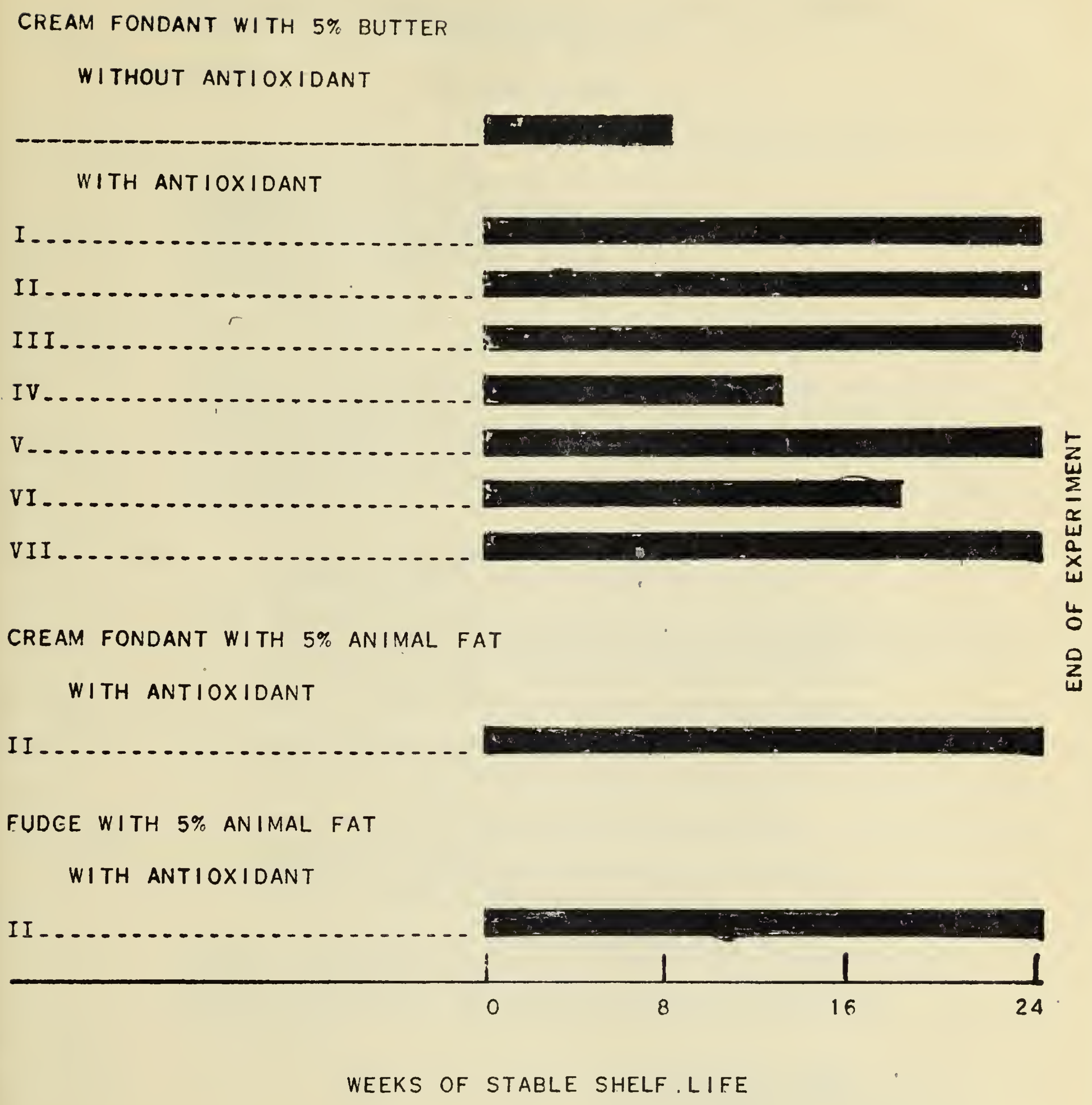
First: Mix the antioxidant with the melted fat. *Second:* Add to the batch after most of the cooking is finished if possible. Butylated hydroxyanisole is heat stable and can be cooked into the batch if necessary. Other antioxidants should not be added or cooked at temperatures above 245° F.

The use of antioxidants in candy was investigated in research, supported jointly by the National Confectioners' Association and the Bureau of Agricultural and Industrial Chemistry of the U. S. Department of Agriculture. Full details have been given in reports entitled "Progress in Candy Research", Nos. 22, 23, and 24. These reports are available from the National Confectioners' Association.

Antioxidants	Suppliers
I. Butylated hydroxyanisole (BHA) *Amount:* Use 0.01% of the weight of the fat.	Tennessee Eastman Corporation 1105 London Guarantee & Accident Bldg. 360 North Michigan Ave. Chicago 1, Ill. Universal Oil Products Co. 310 South Michigan Ave. Chicago 4, Illinois
II. Mixture: Butylated hydroxyanisole-propyl gallate-citric acid, etc. (Stabolec, Sustane, Tenox II) *Amount:* Use 0.015-0.025% of the weight of the fat. (Do not exceed 0.015% of BHA and propyl gallate)	The American Lecithin Co. Woodside, Long Island 77, New York Tennessee Eastman Corporation 1105 London Guarantee & Accident Bldg. 360 North Michigan Ave. Chicago 1, Ill. Universal Oil Products Co. 310 South Michigan Ave. Chicago 4, Ill.
III. Nordihydroguaiaretic acid (NDGA) *Amount:* Use 0.01% of the weight of the fat.	William J. Strange Co. 342 North Western Ave. Chicago 12, Ill.
IV. Mixture: Propyl gallate-citric acid-natural antioxidants (G-4) *Amount:* Use 0.20-0.25% of the weight of the fat. (Do not exceed 0.01% propyl gallate)	The Griffith Laboratories, Inc. 1415 West 37th St. Chicago 9, Ill.
V. Brewers yeast *Amount:* Use not more than 3% of the weight of the candy.	Obtain names of suppliers from Brewers' Yeast Council 605 North Michigan Ave. Chicago 11, Ill.
VI. Primary yeast *Amount:* Use not more than 3% of the weight of the candy.	Standard Brands 1015 South Independence Blvd. Chicago 24, Ill.
VII. Oat flours (Avenex, Pawnee Oat Flour) *Amount:* Use 2% or more of the weight of the candy	Avenex Corporation 250 West 57th St. New York 19, N. Y. National Oats Co. Cedar Rapids, Iowa

These names are furnished for your convenience and not as a recommendation or endorsement of particular products. The listing is complete insofar as it can be ascertained from the current "Thomas' Register".

STORAGE LIFE OF CANDY INCREASED BY ADDING ANTIOXIDANTS



Somewhat different results suggesting a different order of efficiency for the various antioxidants might have been obtained under different conditions.

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H. MACGREGOR TUTTLE, JR.
MANAGER, FIELD & PROMOTION

JAMES E. MACK
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1028 CONNECTICUT AVE., N.W.
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NATIONAL 8-6555

NATIONAL PURITY CONFECTIONERS ASSOCIATION

National Confectioners' Association
of the United States, Inc.

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FRANKLIN 2-1492

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PHILIP WUNDERLE, III
PH. WUNDERLE
PHILADELPHIA, PA.

February 27, 1953

Honorable Charles W. Crawford
Commissioner, Food and Drug Administration
Federal Security Building North
Fourth St. and Independence Avenue, S. W.
Washington 25, D. C.

Dear Dr. Crawford:

Several questions have arisen in connection with the use of antioxidants and emulsifiers. It would be helpful if you would advise me whether or not it would be a violation of the Food, Drug and Cosmetic Act of 1938 if the following antioxidants were used in the manufacture of confectionery in amounts not to exceed those indicated:

I. Butylated hydroxyanisole (BHA)
Amount: Use 0.01% of the weight of the fat.

II. Mixture: Butylated hydroxyanisole-propyl gallate-citric acid, etc. (Stabolec, Sustane, Tenox II)
Amount: Use 0.015-0.025% of the weight of the fat.
(Do not exceed 0.015% of BHA and propyl gallate)

III. Nordihydroguaiaretic acid (NDGA)
Amount: Use 0.01% of the weight of the fat.

IV. Mixture: Propyl gallate-citric acid-natural antioxidants (G-4)
Amount: Use 0.20-0.25% of the weight of the fat.
(Do not exceed 0.01% propyl gallate)

It would also be helpful if you would indicate whether or not it would be a violation of the Food, Drug and Cosmetic Act if these products were used in the manufacture of foods other than confectionery.

Sincerely yours,

Philip P. Gott

PHILIP P. GOTT
President

PPG/sb

FEDERAL SECURITY AGENCY
FOOD AND DRUG ADMINISTRATION
WASHINGTON 25, D. C.

MAR 19 1953
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.
MAR 17 [illegible]

Mr. Philip P. Gott
National Confectioners' Association
Suite 426, 221 North LaSalle Street
Chicago 1, Illinois

Dear Mr. Gott:

Mr. Mack delivered your letter of February 27 inquiring as to the propriety of using four antioxidant preparations in the production of candy.

From the standpoint of safety, we would have no adverse comment to offer concerning the proposed use of the butylated hydroxyanisole or a mixture of butylated hydroxyanisole with propyl gallate and citric acid presumably in propylene glycol.

We have a reservation as far as the nordihydroguaiaretic acid proposal is concerned. This product was developed during the war years and, while preliminary pharmacological studies appeared to demonstrate that it was not to be regarded as a poisonous or deleterious substance, review of the available data leads to the conclusion that it would be preferable to have some additional toxicity work performed before making any definite commitment as to the probabilities of injury caused by the ingestion of small quantities of this product over long periods of time. So far, we have not been supplied with these additional data, nor do we have evidence that nordihydroguaiaretic acid is poisonous.

We hesitate to comment about your item IV, covering a mixture of propyl gallate, citric acid, and natural antioxidants, because of the possibility that something under the heading of "natural antioxidants" might not be a satisfactory item. We have, however, seen a preparation marketed under the designation "G-4" which was comparable to the one under your item II and had no adverse comment to offer concerning its proposed use.

The comments above would apply to food products generally, in addition to confectionery. However, in the case of those foods for which standards of identity have been promulgated under the Act, the antioxidants mentioned should not be used unless and until the standards are amended to make provision for their use.

Of course, where a packer elects to use one of the abovementioned substances or mixtures, the presence of the additive must be declared on the label using the common names and a statement that the substances have been added as preservatives.

You will note that the above comments relate to safety. The question of whether these substances are "nutritive" is one on which we have no conclusive facts. On the basis of opinion, we must question whether any of the specific substances named, with the exception of citric acid, are utilized by the body. We recognize, however, that substantial experimental work would be needed to settle the question. In view of the very small amounts of antioxidants that would actually be used, we have no plans for conducting such an investigation.

Sincerely yours,

CWCrawford

C. W. Crawford
Commissioner of Food and Drugs

cc Mr. James E. Mack
1028 Connecticut Avenue, NW
Washington 6, D.C.